

## A SET OF CRITICAL LOADING CONFIGURATIONS OF THE IPEN/MB-01 REACTOR

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During 15 years, IPEN/MB-01 reactor has been operated jointly by IPEN and CTMSP to perform several experiments in order to validate calculational methods and related nuclear data libraries. Recently, IPEN has been invited to participate on the ICSBEP ( International Criticality Safety Evaluation Project). As a first task, IPEN has been engaged in a series of experiments in the IPEN/MB-01 core in order to evaluate critical configurations for a great number of practical applications. The main purpose of this work to contribute to ICSBEP proposing such set of configurations as benchmarks. The selected configurations in a total of five comprises the IPEN/MB-01 core surrounded by a stainless steel baffle and for some configurations consider the presence of burnable poison rods ( $\text{Al}_2\text{O}_3\text{-B}_4\text{C}$ ; 5% mass content of B-10). The criticality condition was determined by means of a reactimeter plus an artifact based on the isothermal reactivity coefficient. Since the IPEN/MB-01 core possesses an average reactivity coefficient of around  $-6.0$  pcm/C in the range of 16 through 20 C, the procedure adopted was to decrease the reactor temperature up to 16 C, to criticalize the reactor in this condition, to increase the power to 1.0 W in order to have a good statistics and finally to steadily increase the temperature up to 20.5C and stabilize the system. The final reactivity is obtained by the reactimeter removing all the control rods from the core. From this approach it could be obtained very high accuracy on the measured reactivity. The criteria was to choose configurations that has reactivity excess either positive or negative less than 10pcm. The final data takes care of the uncertainty due to manufactures ( Input data) and was considered to be less than 50 pcm. The calculational approach of the five critical configurations consider MCNP-4C ( ENDF/B-VI.8 library) and SCALE 4.4a systems. The results are consistent for a criticality analyses point of view.